

Title (en)  
GAS TURBINE ENGINE WITH TRANSCRITICAL VAPOR CYCLE COOLING

Title (de)  
GASTURBINENMOTOR MIT KÜHLUNG DURCH TRANSKRITISCHEN DAMPFZYKLUS

Title (fr)  
MOTEUR À TURBINE À GAZ AVEC REFROIDISSEMENT À CYCLE DE VAPEUR TRANSCRITIQUE

Publication  
**EP 3296665 A1 20180321 (EN)**

Application  
**EP 17191939 A 20170919**

Priority  
US 201615269217 A 20160919

Abstract (en)  
A gas turbine engine (20) has a compressor section (24), a combustor (56), and a turbine section (28). An associated fluid is to be cooled and an associated fluid is to be heated. A transcritical vapor cycle (185; 234; 240) heats the fluid to be heated, and cools the fluid to be cooled. The transcritical vapor cycle (185; 234; 240) includes a gas cooler (165; 246) in which the fluid to be heated is heated by a refrigerant in the transcritical vapor cycle (185; 234; 240). An evaporator heat exchanger (174; 254) at which the fluid to be cooled is cooled by the refrigerant in the transcritical vapor cycle (185; 234; 240). A compressor (188; 242) upstream of the gas cooler (165; 246) compresses the refrigerant to a pressure above a critical point (160) for the refrigerant. An expansion device (194; 248) expands the refrigerant downstream of the gas cooler (165; 246), with the evaporator heat exchanger (174; 254) being downstream of the expansion device (194; 248), and such that the refrigerant passing through the gas cooler (165; 246) to heat the fluid to be heated is generally above the critical point (160).

IPC 8 full level  
**F25B 9/00** (2006.01); **F25B 9/06** (2006.01)

CPC (source: EP US)  
**F02C 3/04** (2013.01 - US); **F02C 7/185** (2013.01 - US); **F02C 7/222** (2013.01 - US); **F02C 7/224** (2013.01 - US); **F25B 9/004** (2013.01 - US); **F25B 9/008** (2013.01 - EP US); **F25B 9/06** (2013.01 - EP US); **F25B 40/02** (2013.01 - US); **F25B 2309/005** (2013.01 - US); **F25B 2309/061** (2013.01 - US); **F25B 2339/047** (2013.01 - EP US); **F25B 2400/14** (2013.01 - EP US)

Citation (search report)

- [X] US 2014260340 A1 20140918 - VAISMAN IGOR [US], et al
- [A] US 2005061012 A1 20050324 - ZYWIAK THOMAS [US], et al
- [A] US 2015007600 A1 20150108 - GODECKER WILLIAM J [US], et al

Cited by  
EP4148252A1; GB2610566A; US12006055B2; US11993387B2; US11920540B2; US11994067B2

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)  
BA ME

DOCDB simple family (publication)  
**EP 3296665 A1 20180321; EP 3296665 B1 20190904**; EP 3594590 A1 20200115; EP 3594590 B1 20220323; EP 4036494 A1 20220803; US 10823462 B2 20201103; US 11549728 B2 20230110; US 11976863 B2 20240507; US 2018080688 A1 20180322; US 2021018228 A1 20210121; US 2023041007 A1 20230209

DOCDB simple family (application)  
**EP 17191939 A 20170919**; EP 19195234 A 20170919; EP 22163661 A 20170919; US 201615269217 A 20160919; US 202017060513 A 20201001; US 202217961606 A 20221007